APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Rohit Ramani et al. Examiner: Christine Y. Ng

Serial No.: 10/017,642 Group Art Unit: 2616

Filed: December 14, 2001 Docket: 1488.011US1

For: TECHNIQUE TO IMPROVE THE PERFORMANCE OF TRANSMISSION CONTROL PROTOCOL- TCP IN LOSSY NETWORKS

APPEAL BRIEF UNDER 37 CFR § 41.37

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is presented in support of the Notice of Appeal to the Board of Patent Appeals and Interferences, filed herewith, from the rejection of claims 1-3, 8-10, 12-14, 19-21, 26-29 and 33-36 of the above-identified application, as set forth in the Office Action mailed on October 3, 2007. The Office Action of October 3, 2007 reopened prosecution in this case in response to an Appeal Brief that was filed on June 26, 2007. Previously, the Office Action of June 12, 2007 reopened prosecution in response to an Appeal Brief file on January 29, 2007.

The Appellant respectfully submits that the previously paid appeal fee per U.S.P.T.O. rules covers any fees associated with this present Appeal Brief. However, if any further fees are required, the Commissioner of Patents and Trademarks is hereby authorized to charge Deposit Account No. 19-0743 for such fees. The Appellants respectfully request consideration and reversal of the Examiner's rejections of pending claims.

1. REAL PARTY IN INTEREST

The real party in interest of the above-captioned patent application is the assignee, SASKEN COMMUNICATION TECHNOLOGIES LIMITED.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant that will have a bearing on the Board's decision in the present appeal.

3. STATUS OF THE CLAIMS

The present application was filed on December 14, 2001 with claims 1-36. A non-final Office Action was mailed February 9, 2006. A Final Office Action was mailed July 24, 2006. An Appeal Brief was filed on January 29, 2007, and an Office Action of June 12, 2007 reopened prosecution. An Appeal brief was submitted on June 26, 2007. A non-final Office Action was mailed on October 3, 2007 that once again reopened prosecution and in which claims 1-3, 8-10, 12-14, 19-21, 26-29, and 33-36 were rejected and claims 4-7, 11, 15-18, 22-25 and 30-32 were objected to. Claims 1-3, 8-10, 12-14, 19-21, 26-29 and 33-36 stand twice-rejected, remain pending, and are the subject matter of the present appeal.

4. STATUS OF AMENDMENTS

No amendments have been made subsequent to the Final Office Action dated July 24, 2006, the Office Action dated June 12, 2007, or the Office Action dated October 3, 2007.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Some aspects of the present inventive subject matter include, but are not limited to, in one embodiment, as recited in independent claim 1, a method for providing a transport protocol within a lossy network. The method includes receiving multiple packets. (Page 7, lines 7-8; FIG. 3, No. 115; FIG. 5, No. 510). Each of the received packets includes a header and an associated sequence number, and the header includes a congestion alleviation indication and an impending congestion indication. (Page 7, lines 8-17). The network is monitored for congestion caused by the received packets. The header of some of the packets are marked with an impending congestion indication based on the outcome of the monitoring of the network. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). The monitored multiple packets are transmitted through the lossy network. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). Acknowledgements of receipt are returned for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). Each of the received acknowledgements are monitored for the sequence number and the marked impending congestion indication associated with each of the received packets. (Page 9, lines 3-4; FIG. 3, No. 110; FIG. 5, No. 560). A congestion control mechanism is invoked to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and the header is marked with a congestion alleviation indication. (Page 9, lines 4 – 21; FIG. 3, No. 110; FIG. 5, No. 570).

In another embodiment, as recited in independent claim 12, a computer-readable medium (FIG. 6, No. 604) is disclosed that has computer-executable instructions (FIG. 510, Nos. 510-570) for providing a transport protocol within a lossy network. The instructions allow for receiving multiple packets. (Page 7, lines 7-8; FIG. 3, No. 115; FIG. 5, No. 510). Each of the received packets includes a header and an associated sequence number, and the header includes a congestion alleviation indication and an impending congestion indication. (Page 7, lines 8-17). The instructions further allow for monitoring the network for congestion caused by the received packets. The instructions also mark the header of some of the packets with an impending

congestion indication based on the outcome of the monitoring, and transmit the monitored multiple packets through the lossy network. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530; Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). The instructions return acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). The instructions further monitor each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets. (Page 9, lines 3-4; FIG. 3, No. 110; FIG. 5, No. 560). The instructions also allow for invoking a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further for marking the header with a congestion alleviation indication. (Page 9, lines 4 – 21; FIG. 3, No. 110; FIG. 5, No. 570).

In another embodiment, as recited in independent claim 19, a computer system provides a transport protocol within a lossy network. (FIGS. 1, 2, and 3). The computer system includes a storage device, an output device, and a processor. (FIG. 5, Nos. 602, 604, 612, 614, and 618). The processor is programmed to repeatedly perform a method. The processor programmed method includes receiving multiple packets. (Page 7, lines 7-8; FIG. 3, No. 115; FIG. 5, No. 510). Each of the received packets includes a header and an associated sequence number, and the header includes a congestion alleviation indication and an impending congestion indication. (Page 7, lines 8-17). The method monitors the network for congestion caused by the received packets, and marks the header of some of the packets with an impending congestion indication based on the outcome of the monitoring. The method further transmits the monitored multiple packets through the lossy network (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530; Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530), and returns acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). Lastly, the method monitors each of the received acknowledgements for the

sequence number and the marked impending congestion indication associated with each of the received packets (Page 9, lines 3-4; FIG. 3, No. 110; FIG. 5, No. 560), and invokes a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and marks the header further with congestion alleviation indication. (Page 9, lines 4 – 21; FIG. 3, No. 110; FIG. 5, No. 570).

In another embodiment, as recited in independent claim 26, an apparatus provides a transport protocol within a lossy network. (FIGS. 1, 2, and 3). The apparatus includes a sender base station. (FIG. 3, No. 115). The sender base station receives multiple packets from a sender and outputs the packets through a lossy network. (Page 7, lines 7-8; FIG. 3, No. 115; FIG. 5, No. 510). Each of the received packets includes a header and an associated sequence number, and the header includes a congestion alleviation indication and an impending congestion indication. (Page 7, lines 8-17). A communication network includes an analyzer to receive the outputted packets, to monitor the network for congestion caused by the received packets, and to further mark the header of some of the received packets with an impending congestion indication based on an outcome of the monitoring. (FIG. 3, No. 320). A receiver base station includes a transmit module to transmit the packets through the lossy network. (Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530; Page 7, line 18 – Page 8, line 3; FIG. 3, No. 320; FIG. 5, Nos. 520, 530). A receiver receives the transmitted packets and sends acknowledgements back to the sender through the communication network. (Page 7, line 18 – Page 8, line 3; FIG. 3, Nos. 140, 320; FIG. 5, Nos. 520, 530). The acknowledgements include a sequence number associated with each of the received packets, any associated marked impending congestion indication, and the congestion alleviation indication. The sender monitors each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets. (Page 9, lines 3-4; FIG. 3, No. 110; FIG. 5, No. 560). The sender further invokes a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further marks the header with congestion alleviation indication. (Page 9, lines 4 – 21; FIG. 3, No. 110; FIG. 5, No. 570).

This summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to the appended claims and their legal equivalents for a complete statement of the invention.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-3, 12-14, 19-21, and 26-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapman, et al. (U.S. Patent No. 6,922,390) in view of Benning et al. (U.S. Patent No. 5,917,823).

Claims 9, 10, and 34-36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapman, et al. (U.S. Patent No. 6,922,390) in view of Benning et al. (U.S. Patent No. 5,917,823) and further in view of Takagi (U.S. Patent No. 6,937,600).

Claims 8 and 33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chapman et al. (U.S. Patent No. 6,922,390) in view of Benning et al. (U.S. Patent No. 5,917,823) and in further view of LaGalbo et al. (U.S. Patent No. 6,947,446).

7. ARGUMENT

A. Introduction

As stated above in Section No. 6, the pending claims were rejected under 35 U.S.C. § 103(a) as being unpatentable over a combination of Chapman et al. (U.S. Patent No. 6,922,390), Benning et al. (U.S. Patent No. 5,917,823), LaGalbo et al. (U.S. Patent No. 6,947,446), and Takagi (U.S. Patent No. 6,937,600). The Appellant respectfully seeks reversal of this rejection.

A patent may not be obtained for an invention, even though the invention is not identically disclosed or described in a single patent or other publication, if the differences between the subject matter of the invention and the prior art are such that the subject matter as a whole would have been obvious at the time that the invention was made to a person having ordinary skill in the art to which the subject matter of the invention pertains.[1] An obviousness analysis under § 103 is objective. That is, the scope and content of the prior art are determined, the differences between the prior art and the claims at issue are ascertained, and the level of ordinary skill in the pertinent art is resolved. It is against this background that the obviousness or nonobviousness of the subject matter is determined. Other considerations such as commercial success, long felt but unsolved need, and the failure of others might be utilized to shed light on the circumstances surrounding the origin of the subject matter sought to be patented.[2] While the obviousness analysis need not seek out precise teachings directed to the specific subject matter of a claim, the analysis should nevertheless be explicit, including some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, and not based on mere conclusory statements.[3] An indication of a teaching, suggestion, or motivation in the prior art may be part of this analysis, since there is no necessary inconsistency between the idea underlying the teaching, suggestion, and motivation test and the *Graham* analysis. However, the general principle of the teaching, suggestion, and motivation test should not be transformed into a rigid rule that limits the obviousness inquiry.[4] Rather, the approach to the determination of

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[1] 35 U.S.C. § 103(a).
[2] *KSR International Co. v. Teleflex Inc.*, 550 U.S. ____ , p. 2 slip opinion (2007), *citing Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 15-17 (1966).
[3] *Id.*, p.14, *citing In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).
[4] *Id.*, p. 15.

obviousness or nonobviousness should remain expansive and flexible.[5] And further while there is a need for caution in granting a patent based on a combination of elements found in the prior art,[6] a patent composed of several elements is not proved obvious merely by showing that each of its elements was, independently, known in the prior art. Therefore, it can be important to identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.[7]

B. The Cited Art And The Claimed Subject Matter

U.S. Patent No. 6,922,390 to Chapman et al. ("the '390 patent") relates to a method and apparatus for forecasting and controlling congestion within a data transport network. (Col. 1, lines 9-12). The Office Action of February 9, 2006 admits that the '390 patent does not disclose a header that includes a congestion alleviation indication. The Office Action of February 9, 2006 further admits that the '390 patent does not mark the header with a congestion alleviation indication after invoking a congestion control mechanism. The Office Actions of July 24, 2006, June 12, 2007, and October 3, 2007 repeat these admissions.

U.S. Patent No. 5,917,823 to Benning et al. relates to a packet switched network that supports X-series protocol access wherein permanent virtual connection trunks are used as the backbone trunks for the network. (Col. 1, lines 28-31). Packet flow control is handled in part by the use of an Explicit Congestion Notification bit (BECN) and the adjusting of the window size of any virtual circuit that is experiencing congestion. A packet with the BECN bit set indicates that that particular virtual circuit was following a route that was experiencing some form of congestion. The data on that virtual circuit is then throttled until the congestion is resolved. Benning et al. indicates that packets may arrive with clear BECN bits for two reasons: either the congestion has cleared up or the routing system has re-routed the path over a different set of trunks. (Col. 5, lines 30-63).

U.S. Patent No. 6,937,600 to Takagi relates to a communication device and method using a lower layer and an upper layer. Takagi indicates that congestion control can be carried out by

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[5] *Id.*, p. 11.
[6] *Id.*, p.11.
[7] *Id.*, pp. 14-15.

reducing the amount of data that can be transmitted to a network by reducing a window size. (Col. 13, lines 39-41). As part of a TCP/IP specification, a bit in the TOS (Type of Service) field is set as a CE (Congestion Experienced) bit. Also, in a Reserved field, a bit is set as a CWR (Congestion Window Reduced) bit and another bit is set as an ECN-Echo bit (Explicit Congestion Notification). (Col. 13, line 66 – Col 14, line 7). When the CE bit is set to 1, the ECN-Echo bit is set to 1 until a packet with the CWR bit set to 1 is received. At this point, the window size is reduced by carrying out congestion control. (Col. 14, lines 27-35).

Claim 1 of the pending application recites a method for a transport protocol within a network. The packets transmitted through the network include a header, and the header includes a congestion alleviation indication. After invoking a congestion control mechanism, the header is marked with a congestion alleviation indication. All of the other independent claims (*i.e.*, claims 12, 19, and 26) recite these same limitations.

With all due respect to the Patent Office and the Examiner, the cited art in general, and Benning et al. in particular, simply does not disclose a congestion alleviation indication. Consequently, since the scope and content of the cited references do not disclose either a congestion alleviation indication, or marking a header with a congestion alleviation indication, the Patent Office has failed to establish a *prima facie* case of obviousness, and the Appellant respectfully seeks reversal of the rejection of the claims.

C. The PTO Has Failed To Establish A *Prima Facie* Case Of Obviousness

The Patent Office has failed to established a *prima facie* case of obviousness under 35 U.S.C. § 103(a) at least because neither the '390 patent to Chapman et al. nor the '823 patent to Benning et al. discloses a header record containing a congestion alleviation indication, or marking a header with a congestion alleviation indication after invoking a congestion control mechanism.

Contrary to the assertions in the Office Action of October 3, 2007, the Explicit Congestion Notification (BECN) bit of Benning et al. does not read on the "congestion alleviation indication" as recited in the claims.

First, as disclosed in Benning et al., a cleared BECN bit may indicate two conditions. Either the congestion (on the particular virtual circuit at hand) has cleared up, or the routing

system has re-routed the path (of the virtual circuit) over a different set of trunks. (Col. 5, lines 60-63). Therefore, if the BECN bit is cleared because the virtual circuit has been re-routed over a different set of trunks, then it is quite likely that congestion still remains on the first set of trunks over which the virtual circuit was established. That is, congestion has indeed not been eliminated, and the BECN is not a congestion alleviation indication as recited in the presently claimed subject matter.

Second, the BECN bit suffers from the same shortcoming as the EFCI bit of Lee (which was relied upon in the Advisory Action of October 18, 2006, but since abandoned by the Patent Office). That is, one can never be certain with the BECN bit of Benning et al, or the EFCI bit of Lee, whether or not congestion has been alleviated, and because of this, the BECN bit is not a congestion alleviation indication as recited in the presently claimed subject matter. When the BECN bit of Benning et al. is set, congestion exists in the system, the virtual circuit is re-routed over a different set of trunks, ***and*** congestion still exists in the original set of trunks for a period of time after the re-routing. Moreover, even when the BECN bit is cleared, one can not be certain that congestion has been alleviated because congestion can still exist in the original set of trunks. Additionally, if during the time period at hand, there has been no congestion, the BECN bit will be not be set (*i.e.,* it will be clear). In such a case, even though the BECN bit is not set, congestion has not been alleviated because there has never been any congestion. Therefore, the congestion alleviation indication of the presently claimed subject matter provides information that simply cannot be provided by the BECN bit of Benning et al---that is, there is no doubt that there has been congestion and that the congestion has been alleviated.

Interestingly, the name of the BECN bit itself, *i.e.* the Explicit Congestion Notification bit, somewhat tellingly, only suggests that the bit may be used to indicate that there is congestion, not that congestion has been alleviated. The bit name does not disclose, suggest, teach, or hint that it may indicate congestion alleviation. More tellingly, the portion of Benning et al. cited by the Office Action (Col. 5, lines 30-65) actually teaches away from the congestion alleviation indication of the presently claimed subject matter. Specifically, the cited section of Benning et al. boldly states that a reason that the BECN bit is clear is that congestion has cleared up. One of skill in the art, upon reading this, would not then be motivated to come up with a congestion alleviation indication. However, as pointed out above, even with a clear BECN bit,

congestion may still exist in the system over other trunks, or congestion may have never existed in the system. Consequently, without the Applicant's disclosure, the art would in all likelihood still be suffering from this void, since Benning et al. has explicitly mislead those of skill in the art to believe that its BECN bit, always and without more, indicates that congestion has been alleviated. However, as illustrated in the previous paragraph, this is just not true. Simply put, the setting of an Explicit Congestion Notification bit in Benning et al. and the setting of a congestion alleviation indication in the presently claimed subject matter provide two distinct pieces of information. A congestion alleviation indicator indicates congestion alleviation and does not indicate congestion, and an explicit congestion notification indicates congestion and does not indicate congestion alleviation.

Consequently, a person of skill in the art, upon examining the BECN bit, can never tell, without further analysis or information, notwithstanding the misleading teachings in Benning et al., whether congestion has been alleviated. The Applicant's disclosure has filled this void in the prior art, for in the Applicant's disclosure, the congestion alleviation indication always, without more, indicates whether congestion has been alleviated or not. Benning et al. fails to teach or suggest a dedicated congestion alleviation indication (and indeed teaches away from it), the logic of the Office Action amounts to invention based upon the Applicant's disclosure, and the Patent Office consequently fails to establish, per the *Graham* factors, a *prima facie* case of obviousness. The Applicant therefore respectfully requests the reversal of the rejection of the claims.

8. SUMMARY

It is respectfully submitted that the art cited does not render the claims obvious and that the claims are patentable over the cited art. Reversal of the rejection and allowance of the pending claims are respectfully requested.

Respectfully submitted,

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Date November 20 2007 By

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 20th day of November 2007.

Name

Signature

CLAIMS APPENDIX

1. A method for providing a transport protocol within a lossy network, comprising:

receiving multiple packets, wherein each of the received packets includes a header and an associated sequence number, wherein the header includes a congestion alleviation indication and an impending congestion indication;

monitoring the network for congestion caused by the received packets;

marking the header of some of the packets with an impending congestion indication based on the outcome of the monitoring;

transmitting the monitored multiple packets through the lossy network;

returning acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication;

monitoring each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets; and

invoking a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further marking the header with a congestion alleviation indication.

2. The method of claim 1, wherein monitoring the network for congestion, comprises:

monitoring the number of packets waiting in line to be transmitted; and

comparing the number of packets waiting in line to a predetermined minimum line size and a predetermined maximum line size.

3. The method of claim 2, wherein marking the header of some of the packets with an impending congestion indication, comprises:

if the number of packets waiting in line is greater than the predetermined minimum line size and less than the predetermined maximum line size, then marking the header of some of the

received packets based on a predetermined probability with an impending congestion indication; and

if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

8. The method of claim 1, further comprising:

providing a forward error correction to the header of each packet.

9. The method of claim 1, wherein marking the header of some of the multiple packets with an impending congestion indication, comprises:

flagging CE (Congestion Experienced) bits in the header of some of the multiple packets; and

flagging a CWR (Congestion Window Reduced) bit in the header of some of the multiple packets.

10. The method of claim 9, wherein returning acknowledgements comprise:

flagging an ECE (Explicit Congestion Notification Echo) bit in the acknowledgements.

12. A computer-readable medium having computer-executable instructions for providing a transport protocol within a lossy network, comprising:

receiving multiple packets, wherein each of the received packets includes a header and an associated sequence number, wherein the header includes a congestion alleviation indication and an impending congestion indication;

monitoring the network for congestion caused by the received packets;

marking the header of some of the packets with an impending congestion indication based on the outcome of the monitoring;

transmitting the monitored multiple packets through the lossy network;

returning acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication;

monitoring each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets; and

invoking a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further marking the header with a congestion alleviation indication.

13. The computer-readable medium of claim 12, wherein monitoring the network for congestion, comprises:

monitoring the number of packets waiting in line to be transmitted; and

comparing the number of packets waiting in line to a predetermined minimum line size and a predetermined maximum line size.

14. The computer-readable medium of claim 13, wherein marking the header of some of the packets with an impending congestion indication, comprises:

if the number of packets waiting in line is greater than the predetermined minimum line size and less than the predetermined maximum line size, then marking the header of some of the received packets based on a predetermined probability with an impending congestion indication; and

if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

19. A computer system for providing a transport protocol within a lossy network, comprising:

a storage device;

an output device; and

a processor programmed to repeatedly perform a method, comprising:

receiving multiple packets, wherein each of the received packets includes a header and an associated sequence number, wherein the header includes a congestion alleviation indication and an impending congestion indication;

monitoring the network for congestion caused by the received packets;

marking the header of some of the packets with an impending congestion indication based on the outcome of the monitoring;

transmitting the monitored multiple packets through the lossy network;

returning acknowledgements of receipt for each of the transmitted packets, based on the sequence number associated with each of the packets, and any associated marked impending congestion indication and the congestion alleviation indication;

monitoring each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets; and

invoking a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and marking the header further with congestion alleviation indication.

20. The system of claim 19, wherein monitoring the network for congestion, comprises:

monitoring the number of packets waiting in line to be transmitted; and

comparing the number of packets waiting in line to a predetermined minimum line size and a predetermined maximum line size.

21. The system of claim 20, wherein marking the header of some of the packets with an impending congestion indication, comprises:

if the number of packets waiting in line is greater than the predetermined minimum line size and less than the predetermined maximum line size, then marking the header of some of the received packets based on a predetermined probability with an impending congestion indication; and

if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

26. An apparatus for providing a transport protocol within a lossy network, comprising:

a sender base station to receive multiple packets from a sender and output the packets through a lossy network, wherein each of the received packets includes a header and an associated sequence number, wherein the header includes a congestion alleviation indication and an impending congestion indication;

a communication network including an analyzer to receive the outputted packets and monitor the network for congestion caused by the received packets and to further mark the header of some of the received packets with an impending congestion indication based on an outcome of the monitoring;

a receiver base station including a transmit module to transmit the packets through the lossy network; and

a receiver to receive the transmitted packets and to further send acknowledgements back to the sender through the communication network, wherein the acknowledgements include a sequence number associated with each of the received packets and any associated marked impending congestion indication and the congestion alleviation indication, wherein the sender monitors each of the received acknowledgements for the sequence number and the marked impending congestion indication associated with each of the received packets, and invokes a congestion control mechanism to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements and the marked impending congestion indication, and further marks the header with congestion alleviation indication.

27. The apparatus of claim 26, wherein the analyzer further monitors a number of packets waiting in a line transmitted by the sender base station.

28. The apparatus of claim 26, wherein the analyzer further comprises a comparator to compare the number of received packets waiting in line with a predetermined minimum line size and a predetermined maximum line size, wherein the analyzer marks the header of some of the received packets with the impending congestion indication, based on the outcome of the comparison.

29. The apparatus of claim 28, wherein the analyzer marks the header of some of the received packets when the number of packets waiting in line is greater than the predetermined minimum line size and less than the predetermined maximum line size based on a predetermined probability with an impending congestion indication; and

if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

33. The apparatus of claim 26, wherein the sender further provides a forward error correction to the header of each packet.

34. The apparatus of claim 26, wherein the analyzer marking the header comprises flagging CE bits in the header.

35. The apparatus of claim 26, wherein the sender marking the header comprises flagging a CWR bit in the header.

36. The apparatus of claim 26, wherein the receiver marking the acknowledgement comprises flagging an ECE bit in the acknowledgement.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.